37) A manufacturer produces two models of bicycles. The times (in hours) required for assembling, painting, and packaging each model are as follows:

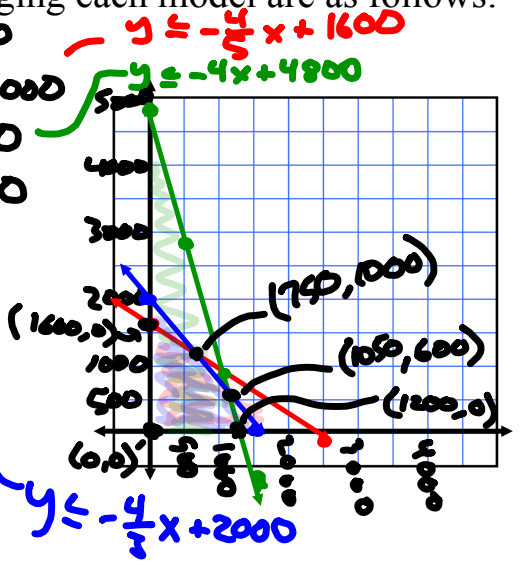
Process	Model A	Model B
Assembly	2	2.5
Painting	4	1
Packaging	1x	0.75y

$x \geq 0 \quad y \geq 0$

$2x + \frac{5}{2}y \leq 4000$

$4x + y \leq 4800$

$x + \frac{3}{4}y \leq 1500$



The Total times available for assembling, painting, and packaging are 4000 hours, 4800 hours, and 1500 hours, respectively. The profits per unit are \$45 for model A and \$50 for model B. How many of each type should be produced to maximize profit?

Objective: $P(x,y) = 45x + 50y$

$P(0,0) = 0$

$P(0,1600) = 80000$

$P(750,1000) = 83750$

$P(1050,600) = 77250$

$P(1200,0) = 54000$

$4x + y \leq 4800$

$x + \frac{3}{4}y \leq 1500$

$x = -\frac{3}{4}y + 1500$

$-\frac{3}{4}(600) + 1500 = -450 + 1500 = 1050$

$2x + \frac{5}{2}y \leq 4000$

$2\left(-\frac{3}{4}y + 1500\right) + \frac{5}{2}y \leq 4000$

$-\frac{3}{2}y + \frac{5}{2}y \leq 1000$

$y \leq 1000$

$4\left(-\frac{3}{4}y + 1500\right) + y \leq 4800$

$-3y + 6000 + y \leq 4800$

$-2y \leq -1200$

$y \leq 600$

41) A farming cooperative mixes two brands of cattle feed. Brand Mooby costs $25 per bag and contains two units of protein, two units of carbs, and two units of silage. Brand MmmSteak costs $20 per bag and contains 1 unit of protein, nine units of carbs, and three units of silage. Find the number of bags of each brand that should be mixed to produce a mixture having a minimum cost. The minimum requirements of protein, carbs, and silage are 12, 36, and 24 units respectively.

Let x = bags of Mooby
y = bags of MmmSteak

$x \geq 0$

$y \geq 0$

$C(x,y) = 25x + 20y$

$2x + 1y \geq 12$ → $y \geq -2x + 12$

$2x + 9y \geq 36$ → $y \geq -\frac{2}{9}x + 4$

$2x + 3y \geq 24$ → $y \geq -\frac{2}{3}x + 8$

$240 = 25(0) + 20(12)$

$195 = 25(3) + 20(6)$

$265 = 25(9) + 20(2)$

$450 = 25(18) + 20(0)$